

PROCEEDINGS
OF THE
CALIFORNIA ACADEMY OF SCIENCES
FOURTH SERIES

VOL. XIX, No. 2, pp. 7-12

JUNE 4, 1930

II
MARINE MOLLUSCA OF THE REVILLAGIGEDO
ISLANDS, MEXICO

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This report properly constitutes a part of the records of the expedition of the California Academy of Sciences of 1925 to various west Mexican islands.¹ The collecting of marine mollusca was placed in the hands of Eric K. Jordan and G. D. Hanna who had a special request from Dr. W. H. Dall to do the task as thoroughly as possible at Clarion and Socorro islands. It appears that no previous visitors to these little-frequented places had brought back more than a scattering of shells and these were not sufficient to permit the determination of the relationships of the group. Indeed, Dr. Dall was led to suppose from the few he had seen from Clarion Island² that an Indo-Pacific fauna was dominant there. Stearns³ in 1894 stated that: "Of Socorro, the principal island of the more distant Revillagigedo group, we know but little or nothing. It was visited several years ago by Grayson, the ornithologist.

¹For a general account of this expedition, see Proc. Calif. Acad. Sci., ser. 4, vol. 15, no. 1, pp. 1-113, pls. 1-10, text figs. 1-7, March 30, 1926. Various technical reports based upon the collections obtained have appeared subsequently.

²Dall & Ochsner, Proc. Calif. Acad. Sci., ser. 4, vol. 17, no. 5, 141-185, June 22, 1929.

³Stearns, Proc. U. S. Nat. Mus., vol. 17, 1894, p. 143.

The few marine shells that have been brought from there are, as would be supposed, familiar Gulf [of California] forms."

The collection enumerated herein came from Socorro and Clarion islands. The smaller San Benedicto and Roca Partida were visited but it was found impracticable to secure any shells. The two larger islands are volcanic with extremely steep submarine slopes. Coral grows in some places but sandy beaches are practically wanting. On the south side of Clarion Island there is a broken coral beach with spots of sand off shore where a limited amount of dredging was practicable; results were rather indifferent. The chart shows a small sand beach near the west end of Socorro Island but rough weather prevented the investigation of it. As a consequence of these physical barriers, collecting had to be confined almost exclusively to shallow waters close in shore. A few beach shells were picked up but most of the collection came from between tides or within reach of a bather below low water. A few species, not otherwise collected, were brought up in the dredge from about 30 fathoms on the south side of Clarion Island. The bottom consisted of rounded chunks of coral and coralline algæ. Had a good patch of shell sand been found this list would undoubtedly be greatly lengthened.

As it is, the list contains the records of 61 species and they do not bear out the suppositions of either Stearns or Dall. Only two species can be said to belong to the Indo-Pacific region. Many of the species are widely distributed along west American shores. Eighteen are known from the southern California coast or islands, and four of these have not previously been recorded from as far south as the Gulf of California. (The *Revillagigedos* are about 240 miles south of Cape San Lucas.) The remainder, 41 species, would seem more properly to belong with the Galapagos Islands or Panamanian faunas than with that of the Gulf of California.

The nearest places from which lists of shells have heretofore been published are the Tres Marias Islands, 300 miles east northeast, and Cape San Lucas 240 miles north. From the first locality Stearns⁴ recorded 89 species of which 22 were

⁴Stearns, Proc. U. S. Nat. Mus., vol. 17, 1894, pp. 139-204. See next paper of Proc. Calif. Acad. Sci., ser. 4, vol. 19, for a larger list of species from the Tres Marias Islands.

found at Socorro and Clarion. Out of eight of his species known to range as far north as California, four were found at Socorro and Clarion.

Carpenter's⁵ list of 360 species from Cape San Lucas, Lower California, did not include 30 forms found at Socorro and Clarion islands. Of the 18 species from the islands known to extend as far north as California, only eight have been listed from the Cape.

Such records as these make it appear almost certain that the marine mollusca have the character of a waif fauna. Species have arrived from hither and yon with little guide but chance. The islands have probably not been connected to the mainland, even by a shallow submarine ridge, during late geologic time, and they do not seem to have existed at all for a sufficiently long period for the mollusca to have developed insular species. The land faunas and floras bear out these suppositions except that many of the groups are sufficiently plastic to have developed insular forms during the time the islands have been above water.

Prior to the departure of the expedition it had been anticipated that the Revillagigedos would furnish a far-flung offshot of the wonderful south sea fauna with many strange things added or evolved. Such a discovery was not to be made.

Clarion and Socorro islands are about 60 miles apart and the intervening waters are supposed to be very deep, yet marine shells of the two islands are very similar. Many of the species were collected at both places and it is probable that the close relationship would be further strengthened had not the collecting stations been somewhat different in physical characters. There was a great deal of coral in evidence about Clarion Island, while on Socorro where collections were made there was very little.

⁵Carpenter, Smith, Misc. Coll., vol. 10, no. 252, 1872, pp. 616-628.

LIST OF SPECIES FOUND ON THE REVILLAGIGEDO ISLANDS

1. *Acmæa discors* Philippi. Clarion and Socorro islands; numerous specimens from each. Range: Gulf of California.
2. *Acteocina smirna* Dall. A few specimens were collected on Clarion Island. Range: Laguna Beach, California to San Salvador.
3. *Anachis coronata* Sowerby. Socorro, several specimens. Range: Cedros Island, Mexico to Panama.
4. *Arca solida* Broderip & Sowerby. Clarion Island, a large number of specimens. Range: San Pedro, California to Peru.
5. *Bittium nicholsi* Bartsch. Clarion Island, one specimen. Range: Gulf of California.
6. *Bursa albifasciata* Sowerby. Clarion Island, one specimen; Socorro Island, seven. Range: Panama. Tryon considered this a subspecies of *Bursa nana* Broderip & Sowerby, but it seems to be specifically distinct.
7. *Cassidea abbreviata* Lamarck. Clarion Island, one specimen. Range: Gulf of California to Ecuador.
8. *Cerithium maculosum* Kiener. Clarion and Socorro islands, a few specimens from each. Range: Lower California to Panama.
9. *Codakia distinguenda* Tryon.⁶ Clarion Island, one beach shell. Range: Gulf of California to Panama.
10. *Collisella æruginosa* Middendorf. Socorro Island, several specimens. Range: Gulf of California to Peru. This species is often listed as *Scurria mesoleuca* Menke.
11. *Conus brunneus* Mawe. Clarion Island, abundant. Range: Gulf of California to Ecuador.
12. *Conus gladiator* Broderip. Clarion and Socorro islands, several specimens from each. Range: Gulf of California to Ecuador.
13. *Conus purpurascens* Broderip. Clarion Island, several specimens. Range: Magdalena Bay, Lower California to Peru.
14. *Coralliophila costata* Blainville. Socorro Island, four specimens. Range: San Miguel Island, California to Panama.
15. *Coralliophila neritoidea* Lamarck. Clarion Island, two specimens; Socorro Island, one. This is a south Pacific shell not heretofore reported from west America.
16. *Coralliophila nux* Reeve. Clarion Island, one specimen; Socorro Island, several. Range: Gulf of California to Panama.
17. *Crepidula aculeata* Gmelin. Clarion Island, one specimen. Range: Port Harford, California to Chile.
18. *Cymatium vestitum* Hinds. Socorro Island, eight specimens. Range: Cedros Island, Mexico to Peru.
19. *Cypræa albiginosa* Gray. Socorro Island, several specimens. Range: Gulf of California to Galapagos Islands.

⁶This is *Lucina* (*Codakia*) *distinguenda* Tryon, Proc. Acad. Nat. Sci. Phila., 1872, p. 130, pl. 6, fig. 3; also *Codakia calpoica* Dall, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 821; formerly called *Lucina tigrina*.

20. *Cypraea isabella-mexicana* Stearns. Socorro Island, four specimens. Range: Tres Marias Islands, Mexico.
21. *Cypracassis tenuis* Gray. Clarion Island, one specimen over five inches long. Range: Gulf of California to Galapagos Islands.
22. *Cypraolina margaritula* Carpenter. Clarion Island, one specimen. Range: Gulf of California.
23. *Diadora inaequalis* Sowerby. Clarion Island, three specimens; Socorro Island, two. Range: Santa Barbara, California to Ecuador.
24. *Diadora panamensis* Sowerby. Clarion Island, four specimens. Range: Gulf of California to Peru. This species is sometimes listed as *Fissuridea alta* C. B. Adams.
25. *Diplodonta subquadrata* Carpenter. Clarion Island, a large number of specimens taken from coral heads. Range: Catalina Island, California to Peru.
26. *Epidromus nitidulus* Sowerby. Socorro Island, eight specimens. This is a south Pacific species not heretofore recorded from west America.
27. *Fissurella obscura* Sowerby. Socorro Island, three specimens. Range: Lower California to Peru.
28. *Fissurella volcano* Reeve. Clarion Island, several specimens. Range: Crescent City, California to Panama.
29. *Fundella caudeana* d'Orbigny. Clarion Island, a large number of specimens collected from coral heads. This species was figured by Reeve from Isla Plata as *Malleus vesiculatus*, but Dr. Johnson (Nautilus, Vol. 32, p. 38) has recently placed that name in the synonymy of *F. caudeana*, originally described from the West Indies.
30. *Gadina peruviana* Sowerby. Socorro Island, several specimens. Range: Gulf of California to Chile.
31. *Gastrochana ovata* Sowerby. Clarion Island, numerous specimens taken from coral heads. Range: Gulf of California to Panama.
32. *Helicacis radiatus* Menke. Clarion Island, one specimen; Socorro Island, one. Range: Magdalena Bay, Lower California to Panama. The species is usually listed as *Solarium variegatum* Gmelin.
33. *Hipponix barbatus* Sowerby. Socorro Island, several specimens. Range: Crescent City, California to Panama.
34. *Hipponix tumens* Carpenter. Clarion Island, two specimens. Range: Crescent City, California to San Martin Island, Lower California.
35. *Lacuna unifasciata* Carpenter. Clarion Island, four specimens. Range: Puget Sound to Magdalena Bay, Lower California. This is the southernmost record of the genus.
36. *Latirus concentricus* Reeve. Clarion and Socorro islands, abundant. Range: Acapulco, Mexico to Panama.
37. *Leptothyra lurida* (?) Dall. Clarion Island, four beach worn shells, too badly broken for positive determination. Range: Puget Sound to Peru.
38. *Liotia* sp. Socorro Island, 12 specimens.
39. *Lithophaga calyculatus* Carpenter. Clarion Island, a large number of specimens taken from coral heads. Range: Gulf of California.
40. *Littorina conspersa* Philippi. Socorro Island, abundant. Range: Gulf of California to Ecuador.

41. *Littorina scutulata* Gould. Clarion and Socorro islands, abundant. Range: Alaska to Socorro Island.
42. *Marginella californica* Tomlin. Clarino Island, six specimens; Socorro Island, one specimen. Range: San Pedro, California to Puerto Libertad.
43. *Marginella regularis* Carpenter. Clarion Island, two specimens. Range: Monterey, California to Gulf of California.
44. *Modulus cerodes* A. Adams. Socorro Island, one specimen. Range: Magdalena Bay, Lower California to Panama.
45. *Murex radicata* Hinds. Clarion Island, several specimens; Socorro Island, many. Dall has placed this name in synonymy of *Murex lappa* Broderip, but Tryon and Reeve have held it distinct.
46. *Nerita bernhardi* Reclus. Socorro Island, several specimens. Range: Gulf of California to Peru.
47. *Nerita scabricosta* Lamarck. Socorro Island, a large number of specimens. Range: Lower California to Peru.
48. *Olivella gracilis* Sowerby. Clarion Island, one specimen. Range: Gulf of California to Panama.
49. *Pedalion chemnitzianum* d'Orbigny. Clarion Island, three specimens. Range: Coronado Island, Lower California to Chile.
50. *Phyllonotus radix* Gmelin. Clarion Island, one specimen. Range: Magdalena Bay, Lower California to Peru.
51. *Pyrene (Mitrella) carinata californiana* Gaskoin. Clarion Island, three specimens. Range: Alaska to Salina Cruz, Mexico.
52. *Pyrene fuscata* Sowerby. Clarion and Socorro islands, common. Range: Gulf of California to Galapagos Islands.
53. *Pyrene (Mitrella) ocellata* Gmelin. Clarion Island, one specimen; Socorro Island, several specimens. Range: Gulf of California to Peru. The species is frequently listed as *Nitidella cribraria* Lamarck.
54. *Rissoina stricta* Menke. Socorro Island, several specimens. Range: Gulf of California.
55. *Strigatella tristis* Swainson. Socorro Island, several specimens. Range: Gulf of California to Panama.
56. *Thais patula* Linnæus. Clarion and Socorro islands, very abundant in all stages of growth. Range: Gulf of California to Peru.
57. *Thais planospira* Lamarck. Clarion and Socorro islands, common. Range: Lower California to Peru.
58. *Tritonalia circumtexta* Stearns. Clarion Island, one specimen. Range: Trinidad, California to Scammon Lagoon, Lower California.
59. *Tritonalia* sp. Socorro Island, eight specimens. The species has not been satisfactorily identified.
60. *Truncatella stimpsoni* Stearns. Clarion Island, three specimens. Range: Catalina Island, California to Magdalena Bay, Lower California.
61. *Turbo fluctuosum* Wood. Clarion and Socorro islands; large numbers of specimens from each, showing all stages of growth; some adult individuals are over three inches in diameter. Range: Gulf of California to Peru.